

WHAT IS CLAIMED IS:

1 1. A method of restoring photoreceptor function in a vertebrate eye
2 having a mutant opsin protein, comprising administering to the vertebrate an effective
3 amount of an opsin-binding synthetic retinoid in a pharmaceutically acceptable vehicle,
4 wherein the opsin-binding synthetic retinoid binds to and stabilizes the opsin protein in the
5 eye.

1 2. The method of claim 1, wherein the opsin-binding synthetic retinoid is
2 an 11-*cis*-7-ring retinal or a 9-*cis*-7-ring retinal.

1 3. The method of claim 2, wherein the synthetic retinoid is
2 cycloheptatrienylidene 11-*cis*-locked retinal or cycloheptatrienylidene 9-*cis*-locked retinal.

1 4. The method of claim 1, wherein the opsin-binding synthetic retinoid
2 comprises a synthetic retinoid of formula I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII or
3 XIII.

1 5. The method of claim 4, wherein the opsin-binding synthetic retinoid is
2 a 9-*cis*-fused retinal.

1 6. The method of claim 1, wherein the opsin-binding synthetic retinoid is
2 locally administered to the eye.

1 7. The method of claim 6, wherein the opsin-binding synthetic retinoid is
2 locally administered by eye drops, intraocular injection or periocular injection.

1 8. The method of claim 1, wherein the opsin-binding synthetic retinoid is
2 orally administered to a subject comprising the vertebrate eye.

1 9. The method of claim 1, wherein the mutant opsin protein is P23H
2 mutant opsin protein.

1 10. A method for stabilizing mutant opsin protein, comprising:
2 contacting with the mutant opsin protein with an opsin-binding synthetic
3 retinoid for an amount of time sufficient for the formation of a stabilized opsin/synthetic
4 retinoid complex.

- 1 11. The method of claim 10, wherein the opsin-binding synthetic retinoid
2 comprises a synthetic retinoid of formula I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII or
3 XIII.
- 1 12. The method of claim 11, wherein the opsin-binding synthetic retinoid
2 is a 9-*cis*-locked retinal or an 11-*cis*-locked retinal.
- 1 13. The method of claim 10, wherein the mutant opsin protein is a P23H
2 mutant opsin protein.
- 1 14. The method of claim 13, wherein the opsin-binding synthetic retinoid
2 is an 11-*cis*-7-ring retinal or a 9-*cis*-ring retinal.
- 1 15. The method of claim 14, wherein the opsin-binding synthetic retinoid
2 is cycloheptatrienylidene 11-*cis*-locked retinal or cycloheptatrienylidene 9-*cis*-locked retinal.
- 1 16. A method of ameliorating loss of photoreceptor function in a vertebrate
2 eye, comprising:
3 prophylactically administering an effective amount of an opsin-binding
4 synthetic retinoid in a pharmaceutically acceptable vehicle to a vertebrate eye comprising a
5 mutant opsin protein having a reduced affinity for 11-*cis*-retinal, wherein the synthetic
6 retinoid binds to and stabilizes the mutant opsin protein.
- 1 17. The method of claim 16, wherein the opsin-binding synthetic retinoid
2 is orally administered to a vertebrate.
- 1 18. The method of claim 16, wherein the opsin-binding synthetic retinoid
2 is locally administered to the vertebrate eye.
- 1 19. The method of claim 16, wherein the opsin-binding synthetic retinoid
2 comprises a synthetic retinoid of formula I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII or
3 XIII.
- 1 20. The method of claim 19, wherein the opsin-binding synthetic retinoid
2 is a 9-*cis*-7-ring retinal or an 11-*cis*-7-ring retinal and the mutant opsin protein is a P23H
3 mutant opsin protein.

- 1 21. The method of claim 20, wherein the synthetic retinoid is
2 cycloheptatrienyldene 11-*cis*-locked retinal or cycloheptatrienyldene 9-*cis*-locked retinal.
- 1 22. The method of claim 16, wherein the mutant opsin protein has a
2 mutation in the N-terminal plug
- 1 23. An ophthalmologic composition comprising an opsin-binding synthetic
2 retinoid in a pharmaceutically acceptable vehicle.
- 1 24. The composition of claim 23, wherein the opsin-binding synthetic
2 retinoid comprises a synthetic retinoid of formula I, II, III, IV, V, VI, VII, VIII, IX, X, XI,
3 XII or XIII.
- 1 25. The composition of claim 24, wherein the opsin-binding synthetic
2 retinoid is a 9-*cis*-7-ring retinal or an 11-*cis*-7-ring retinal.
- 1 26. The composition of claim 25, wherein the opsin-binding synthetic
2 retinoid is cycloheptatrienyldene 11-*cis*-locked retinal or cycloheptatrienyldene 9-*cis*-locked
3 retinal.
- 1 27. An oral dosage form comprising an opsin-binding synthetic retinoid in
2 a pharmaceutically acceptable vehicle.
- 1 28. The composition of claim 27, wherein the opsin-binding synthetic
2 retinoid comprises a synthetic retinoid of formula I, II, III, IV, V, VI, VII, VIII, IX, X, XI,
3 XII or XIII.
- 1 29. The composition of claim 28, wherein the opsin-binding synthetic
2 retinoid is a 9-*cis*-7-ring retinal or an 11-*cis*-7-ring retinal.
- 1 30. The composition of claim 29, wherein the opsin-binding synthetic
2 retinoid is cycloheptatrienyldene 11-*cis*-locked retinal or cycloheptatrienyldene 9-*cis*-locked
3 retinal.
- 1 31. A method of identifying an opsin-binding synthetic retinoid to stabilize
2 a mutant opsin protein, comprising:
3 providing an expression system for the expression of a mutant opsin protein;

4 contacting the mutant opsin protein with a synthetic retinoid for a time
5 sufficient and in suitable conditions for the binding of the synthetic retinoid by the mutant
6 opsin protein; and
7 detecting whether the mutant opsin protein binds the synthetic retinoid to form
8 a stable mutant opsin protein/synthetic retinoid complex.

1 32. The method of claim 31, wherein the expression system is a eukaryotic
2 cell line expressing the mutant opsin protein.

1 33. The method of claim 32, wherein the synthetic retinoid is administered
2 to cell culture media in which the eukaryotic cell line is cultured.

1 34. The method of claim 31, wherein the opsin-binding synthetic retinoid
2 comprises a synthetic retinoid of formula I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII or
3 XIII.